

Prescription of Testosterone-Lowering Medications for Sex Offender Treatment in German Forensic-Psychiatric Institutions

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ABSTRACT

Introduction. Different clinical guidelines suggest using testosterone-lowering medications (TLM) in sex offender treatment in addition to psychotherapy. Within Germany, there are two officially approved agents. So far, no current data exist about the routine use of TLM in a clinical context.

Aim. The present observational study evaluates the frequency of the prescription of TLM and other medications in sex offender treatment in German forensic-psychiatric institutions. Experts are asked about the observed effects and side effects of TLM.

Method. The heads of all 69 German forensic-psychiatric hospitals and outpatient clinics were asked to fill out a questionnaire assessing offender characteristics and treatment methods in use.

Main Outcome Measures. Main outcome measures were the number of patients being treated with TLM and other pharmacological agents for reducing sexual drive. Further effects and side effects of the agents were evaluated.

Results. Thirty-two participating institutions reported on 3,963 patients, 611 of them being sex offenders (15.4%). Most sex offenders had been convicted for child sexual abuse (39.8%) or a sexual assault/rape (37.6%). Almost all sex offenders were treated psychotherapeutically and 37% were receiving an additional pharmacological treatment. Of all the sex offenders, 15.7% were treated with TLM; 10.6% were treated with a gonadotropin-releasing hormone agonist; and 5.1% were treated with cyproterone acetate. Of these, 26.0–75.4% showed improvements in such outcomes as reduction of frequency and/or intensity of sexual thoughts. The remaining 21.3% of sex offenders who received a pharmacological agent were treated with selective serotonin reuptake inhibitors (11.5%) or antipsychotic medications (9.8%).

Conclusions. TLM are a frequently used addition to psychotherapy in sex offenders. In light of the lack of controlled clinical trials and the many side effects, benefits and risks should always be thoroughly assessed. **Turner D, Basdekis-Jozsa R, and Briken P. Prescription of testosterone-lowering medications for sex offender treatment in German forensic-psychiatric institutions. J Sex Med 2013;10:570–578.**

Key Words. Sex Offender; Paraphilia; Cyproterone Acetate; GnRH Agonist; Treatment Guidelines

Introduction

The first attempts to treat sex offenders with medications were described in the 1940s [1–3]. Until today, testosterone-lowering medications (TLM) remain an important and frequently employed addition to psychotherapy in sex offender treatment. In Germany, two testosterone-lowering agents have been officially approved for sex offender treatment: cyproterone acetate (CPA;

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Androcur®, Bayer Health Care Pharmaceutical, Berlin, Germany) and triptorelin (Salvacyl®, Dr. Pfleger GmbH, Bamberg, Germany), a gonadotropin-releasing hormone (GnRH) agonist.

CPA

CPA has been used to treat sex offenders since 1966, although European authorities did not officially approve its use for treating sexual deviant behavior until 1973 [4,5]. Shortly beforehand, Laschet and Laschet published the first studies about treating sex offenders with CPA and

reported a decrease in sexual interests and sexual fantasies, a finding also supported by later research [6–11]. Nevertheless, CPA treatment is often accompanied by a large number of side effects caused primarily by lowered serum testosterone concentrations, for example weight gain, gynecostasia, and lethargy [12–14].

CPA is a synthetic testosterone antagonist that acts as an antiandrogen and progestogen. CPA binds to the androgen receptors of, e.g., the testes or different brain areas such as the hypothalamus, the hippocampus, and the amygdala [15–18]. By binding to androgen receptors, CPA competitively replaces testosterone and 5- α -dihydrotestosterone and thus inhibits their synthesis as well as their effect on sexuality and other body functions. CPA further shows progestational action which causes an inhibition of GnRH secretion from the hypothalamus followed by a decreased release of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) from the pituitary gland, which can lead to a decrease in plasma testosterone to castration levels [14,15,19].

GnRH Agonists

In the past, GnRH agonists were used primarily for the treatment of prostate carcinoma but emerged as a useful alternative in sex offender treatment [19]. Allolio et al. described the first patient with a paraphilic symptomatology to be treated successfully with a GnRH agonist [20]. In 2007, triptorelin received approval in the European Union for “the reversible reduction of testosterone to castrate levels in order to decrease sexual drive in adult men with severe sexual deviations.” In 2009, triptorelin was officially approved in Germany for the treatment of men with severe paraphilias.

GnRH agonists have an effect on GnRH receptors of the pituitary gland by permanently stimulating them. After an initial increase of plasma testosterone levels during the first 2 weeks of treatment (“flare-up effect”), the overstimulation causes a desensibilization and downregulation of GnRH receptors in the pituitary gland followed by a decreased release of LH and FSH. The lowered LH concentrations as well as an additional downregulation of LH receptors in the testes and other organs lead to a decreased stimulation of the Leydig cells in the testes, causing a decreased synthesis of testosterone. Thus, plasma testosterone concentrations are lowered to castration level [12,21,22].

So far, different studies stated that GnRH agonist application leads to a decline in sexual fan-

tasies and sexual desire in addition to a decrease in frequency of masturbation and sexual intercourse [12,23–25]. Furthermore, changed brain activation patterns in pedophilic patients and a lowered sperm concentration could be observed after GnRH agonist treatment [25,26]. Different side effects have been described such as weight gain, lethargy, migraine, muscle cramps, and an increase in blood pressure as well as a decrease in bone mineral density [13,27–32]. Most side effects are due to the lowered serum testosterone concentrations and are mostly reversible when TLM is ended.

Current research results still have to be treated cautiously because high-quality clinical studies concerning the effectiveness of CPA or GnRH agonist treatment are still lacking [33]. In particular, there are no randomized controlled clinical trials examining sexual or violent recidivism of sex offenders after TLM treatment [4,28,34]. Nevertheless, different open and uncontrolled studies imply a reduced rate of recidivism after TLM treatment, although because of ethical reasons, appropriate control groups are missing in these studies [23,35]. In light of the fact that despite the insufficient state of research clinical guidelines recommend the use of TLM, the actual distribution of these agents within clinical routine is an important question [28,36]. In this context, Czerny et al. found that 12% of all sex offenders in German forensic-psychiatric hospitals were being treated with TLM in 2001; whereas one half received CPA and the other half GnRH agonists [13]. In the United States and Canada, TLM are also frequently used treatment methods. In the United States in 2009, GnRH agonist treatment was being used in 13% of all community programs, while in 16.7% of them, sex offenders were treated with medroxyprogesterone acetate (MPA), an agent that is not being used in Germany. On the other hand, in 15.3% of all residential programs, sex offenders received a GnRH agonist, while in 17.6% of them, sex offenders were treated with MPA [37]. The use of these medications in Canada appears to be even greater: here, GnRH agonists are being used in 42.1%, MPA in 21.1%, and CPA in 26.3% of all community programs, while in 63.2% of all community programs, more than one medication was used. Further, GnRH agonists were used in 75%, MPA in 50%, and CPA in 50% of all residential programs, while in 75% of all residential programs, more than one medication was used to treat sex offenders. To our knowledge, no data about the frequency of TLM use in European countries are available so far.

Aim

The aim of the present study was to investigate the use of TLM in sex offender treatment in German forensic-psychiatric institutions in 2011. The results of the present study will also provide information about to what extent the importance of TLM treatment in sex offender therapy has changed during the last 10 years.

Method

In Germany, there are two systems in which sex offenders can receive treatment: the correctional system and the forensic-psychiatric system. Pharmacotherapy of sex offenders is more commonly used in the forensic-psychiatric system. Which system is utilized is based on the determination of legal responsibility for the offense and on the offender's risk of re-offending. Offenders judged not to be responsible or as having severely diminished responsibility for an offense punishable by incarceration may receive a forensic-psychiatric hospital-order sentence if their risk of re-offending is high. In all other cases, offenders are allocated to the correctional system. Mentally ill offenders that have committed minor offenses not leading to imprisonment or offenders that were released on probation are mostly sentenced to be treated psychotherapeutically and/or pharmacotherapeutically in a forensic-psychiatric outpatient clinic.

Materials

The evaluation of the different treatment methods for sex offenders in German forensic-psychiatric institutions was assessed using a self-constructed questionnaire with 85 items divided into two thematic sections.

The first part of the questionnaire assesses socio-demographic information (e.g., age, gender) relating to the sex offenders. Further, the offenses and juridical decision leading to their treatment in a forensic-psychiatric institution were evaluated. The number of sex offenders that met the criteria of the according item was to be indicated by the person filling out the questionnaire.

The second part of the questionnaire provides an overview of the psychotherapeutic and pharmacotherapeutic treatment methods used in the participating institutions. The professionals who responded were first of all asked to indicate how many sex offenders had been treated with one of the different psychotherapeutic and pharmaco-

therapeutic treatment options. Particular emphasis was placed on the evaluation of TLM treatment regimes by also considering treatment duration, treatment success, and any observed side effects of the drugs in use. The clinicians were asked to state how long the offenders were already being treated with TLM and in how many offenders' certain effects and side effects could be observed.

Participants

The questionnaire was sent out at the beginning of 2011 to all forensic-psychiatric hospitals and outpatient clinics in Germany (N = 69). After 3, 6, and 9 months, the questionnaire was sent out again to all those institutions that had not answered the request to participate in the study up to that point.

At the end of the data collection process, 50 out of the 69 institutions (72.5%) had replied to the request for study participation. Of these, 32 institutions (64%) were willing to participate, while 18 institutions (36%) were unwilling. Reasons for nonparticipation were lack of time (N = 12), data protection regulations (N = 4), thematically similar studies of their own (N = 1), and no incarcerated sex offenders (N = 1).

In every case, the questionnaire had to be filled out by the medical or psychological head of the according institution. The mean age of the professionals who responded was 51.1 years (standard deviation [SD] = 5.9). Twenty-three were male (71.9%) and nine female (18.1%). Thirty-one were medical doctors and one was a clinical psychologist.

The local ethics committee has given its approval to the study.

Statistical Analysis and Outcome Measures

Data evaluation was conducted using SPSS 17.0 for Windows (SPSS Inc., Chicago, IL, USA). Data analysis was based on descriptive statistics evaluating the frequency of prescription of TLM and the treatment duration as well as the effects and side effects observed after TLM treatment for sex offenders.

Results

Patients

Three thousand nine hundred and sixty-three patients were reported on within the 32 participating institutions (range 56–386 patients per institution). Out of the total patient sample, N = 611

Table 1 Distribution of different sexual index offenses among German sex offenders in forensic-psychiatric institutions

Type of sexual offense	Number of patients (N = 611)
Child sexual abuse	243 (39.8%)
Sexual assault/rape	230 (37.6%)
Sexual assault of persons unable to defend themselves	38 (6.2%)
Sexual homicide	29 (4.7%)
Exhibitionism	25 (4.1%)
Distribution of pornographic material	7 (1.1%)
Other	39 (6.4%)

Table 2 Effects and side effects of cyproterone acetate (CPA) and gonadotropin-releasing hormone (GnRH) agonists

Variables	CPA (N = 25)	GnRH agonist (N = 57)
Reduction of frequency of sexual thoughts	15 (60.0%)	43 (75.4%)
Reduction of intensity of sexual thoughts	13 (52.0%)	38 (66.7%)
Reduction of masturbation frequency	10 (40.0%)	25 (43.9%)
Reduction of consumption of pornographic material	7 (28.0%)	15 (26.3%)
Weight gain	12 (48.0%)	11 (19.3%)
Gynecomastia	9 (36.0%)	7 (12.3%)
Hot flashes	14 (56.0%)	27 (47.4%)
Thromboembolia	1 (4.0%)	—
Decreased body hair	10 (40.0%)	17 (29.8%)
Depression	2 (8.0%)	—
Kidney or liver dysfunction	1 (4.0%)	—
Hypogonadism	2 (8.0%)	2 (3.5%)
Bone mineral density loss	—	8 (14.0%)
Pain at site of injection	12 (48.0%)	19 (33.3%)

(15.4%) patients were sex offenders. The number of sex offenders per institution showed a range from 1 to 65. All sex offenders were male and N = 6 (1.0%) were still under the age of 18 years. N = 503 (82.3%) sex offenders were treated in an inpatient setting, whereas N = 108 (17.7%) were outpatients. Most sex offenders had been convicted for child sexual abuse (39.9%; N = 243) or a sexual assault/rape (37.6%; N = 230) (Table 1).

Treatment

Almost all sex offenders were being treated psychotherapeutically (N = 594, 97.2%). Of these, N = 480 (80.8%) were being treated with cognitive behavioral therapy, N = 90 (15.2%) were being treated psychodynamically, and N = 24 (4.0%) with another psychotherapeutic treatment approach. Figure 1 shows that the total number of pharmacologically treated sex offenders was

N = 226 (37.0%). N = 70 (11.5%) sex offenders were treated with selective serotonin reuptake inhibitors (SSRI) and N = 60 (9.8%) patients were treated with antipsychotic medications (N = 32 olanzapine; N = 20 risperidone; N = 8 levomepromazine). SSRI were prescribed in 20 out of 32 institutions (62.5%), while antipsychotics were prescribed in 15 out of 32 institutions (46.9%).

Further, N = 96 sex offenders (15.7%) were treated with TLM. Of these, 65 were treated with GnRH agonists (10.6% of all sex offenders) and 31 with CPA (5.1% of all sex offenders). GnRH agonists were only prescribed in 17 out of the 32 (53.1%) participating institutions. When comparing the single institutions, the relative number of sex offenders receiving GnRH agonists per institution ranged from 2.0% to 25.5%. CPA was prescribed in 13 institutions (40.6%). The relative number of sex offenders being treated with CPA ranged per institution from 2.0% to 35.3%.

Before starting TLM treatment, informed written consent for the medication was obtained in 78.1% (N = 75) of all men. N = 69 (71.9%) sex offenders were explicitly informed about possible risks and side effects. In the remaining patients, no explicit information about possible risks and side effects and no informed written consent for the medication was obtained before starting TLM treatment. The reasons for not obtaining informed written consent were not evaluated within the study.

The mean duration of GnRH agonist treatment was 13.4 months (SD = 5.2 months), while the mean treatment duration of CPA treatment was 11.8 months (SD = 4.1 months). Table 2 shows that the observed effects and side effects after CPA and GnRH agonist treatment were not reported for all patients. Effects and side effects were

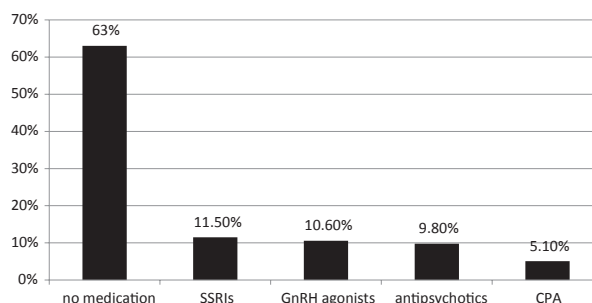


Figure 1 Distribution of different medication among sex offenders in German forensic-psychiatric institutions. CPA = cyproterone acetate; GnRH = gonadotropin-releasing hormone; SSRI = selective serotonin reuptake inhibitors

reported in 80.6% (N = 25) of patients being treated with CPA and in 87.7% (N = 57) of patients being treated with a GnRH agonist.

Table 2 illustrates that CPA as well as GnRH agonist treatment is associated with a notable reduction in frequency and intensity of sexual thoughts and a reduction in the frequency of masturbation and the consumption of pornographic material. However, this reduction was not reported for all patients. Both agents are accompanied by different side effects, which can mainly be traced back to the lowered serum testosterone concentrations. Reported side effects ranged from weight gain, hot flashes, and pain at the site of injection to severe side effects such as kidney or liver dysfunction, bone mineral density loss, or hypogonadism. Kidney and liver dysfunction and depression as well as thromboembolism were only reported for CPA treatment, while a loss of bone mineral density was only reported for GnRH agonist treatment.

Discussion

Although sexual offenses account for only a small proportion of the total crime in Germany (0.8% in 2010), sex offenders constitute a quantitatively important patient population in German forensic-psychiatric institutions [38]. In line with this, the current study showed that 15% of all patients being treated in forensic-psychiatric institutions have committed a sexual offense. This corresponds with the results published by Hahn, who found that 17% of all inpatients treated in German forensic-psychiatric hospitals were sex offenders [39]. Hahn and Worthmüller reported similar numbers for forensic-psychiatric outpatient clinics in Germany, where 17.6% of all patients were treated because of a sexual offense [40]. In our study, the participating institutions did not report any female sex offenders and only six (1%) adolescent sex offenders. Only 5% of forensic-psychiatric patients in Germany are female, and to our knowledge, there are no studies reporting the number of female sex offenders in German forensic-psychiatric institutions. Adolescent sex offenders in Germany are usually not treated in forensic-psychiatric institutions but rather in specialized institutions for juveniles. Thus, one has to keep in mind that the results reported only account for adult male sex offenders.

When taking a closer look at the type of offense the sex offenders have committed in the present

study, it is obvious that the great majority was convicted for child sexual abuse (39.9%) or rape/sexual assault (37.6%). Similar findings were reported by Pozsár et al., who found that 39.6% of all sex offenders in forensic-psychiatric hospitals in Lower Saxony, Germany were convicted for child sexual abuse and 40.9% for attempted rape, rape, or sexual assault [41].

Furthermore, sex offenders have distinct features that are dissimilar to other offender populations, e.g., they have more often experienced sexual abuse themselves during childhood and exhibit different somatic and psychiatric comorbidities and different personality traits [42–46]. This fact indicates that there is a great need for specialized and validated treatment programs in order to prevent relapse. With this in mind, various clinical guidelines for sex offender treatment suggest using psychotherapeutic methods alone in patients with mild paraphilias. Further, these guidelines recommend applying SSRI in patients with mild paraphilias in which psychotherapy alone has not led to the desired effects, and TLM together with psychotherapy in patients with severe paraphilias and sexual sadistic fantasies and behavior, as well as in paraphilic patients with a high risk of recidivism with sexual offenses [28,36].

In the present study, 15.7% of all sex offenders were being treated with TLM. However, TLM are prescribed more often than SSRI (11.5%) or antipsychotic medications (9.8%). TLM are thus the most frequently used agents for treating sex offenders in German forensic-psychiatric institutions. In almost all cases, TLM was carried out in addition to psychotherapeutic treatment methods, a finding that complies with the current guidelines. Here, cognitive behavioral therapy (80.8%) is the most frequently used psychotherapeutic treatment method, followed by psychodynamic treatment methods (15.2%), a finding that also complies with the current guidelines, which suggest to preferentially use cognitive behavioral therapy [28]. Nevertheless, the relative number of sex offenders who are being treated with TLM at the individual institutions ranges from 2.0% to 35.3%. The high range in the frequency of the prescription of TLM at the individual institutions indicates that despite the existing clinical guidelines, there seems to be discordance among clinicians concerning the prescription of TLM. Bearing in mind this discordance in prescription practice and the as yet not fully matured state of research about TLM, informed written consent should be obtained from

and a detailed and comprehensive description of possible risks and side effects of TLM given to every patient before starting TLM therapy. Clinicians would thereby ensure that every patient treated with TLM is aware of risks and side effects, and patient compliance could be increased. The present study showed that only in 78.1% was informed written consent given before starting TLM therapy and only 71.9% of the patients were informed about possible risks and side effects. Future studies should evaluate the reasons why informed written consent is not obtained in every case.

A small increase was observable in the frequency of the use of TLM in sex offender treatment over the past 10 years. While Czerny et al. reported that 12% of all sex offenders were being treated with TLM, the present study found that 15.7% of all sex offenders are currently being treated with TLM [13]. Further distinctions can be found when considering the different agents in use. The number of patients treated with GnRH agonists in particular has increased during the last 10 years. Whereas Czerny et al. found that 6% of all sex offenders were being treated with GnRH agonists, in the present study, 10.6% of all sex offenders were treated with GnRH agonists [13]. On the other hand, the number of sex offenders treated with CPA has decreased from 6% to 5% in the present study [13].

This development can be explained by the in-the-meanwhile changed state of research, because different studies have suggested that GnRH agonists are more potent in decreasing serum testosterone levels compared with CPA [9,20,21,23,24,47,48]. Additionally, the official approval in 2009 by the German Federal Institute for Drugs and Medical Devices of GnRH agonists for the treatment of severe paraphilias can account for the observed increase. Indeed, the number of German forensic-psychiatric institutions using TLM to treat sex offenders appears to be greater than in the United States but comparable to Canada. GnRH agonists are used to treat sex offenders in 53.1% of all forensic-psychiatric institutions in Germany, while in the United States, GnRH agonists are used in 14.2%, and in Canada, in 58.6% of all treatment programs for sex offenders. CPA treatment, on the other hand, is applied in 40.6% of all German forensic-psychiatric institutions, while it is used in 38.2% of all treatment programs for sex offenders in Canada, and MPA is used in 17.2% of treatment programs in the United States [37]. Nevertheless, one has to keep

in mind that the legal systems and the legal requirements concerning the question of TLM prescription could be responsible for the differing numbers in the frequency of TLM prescription when comparing the single countries.

The results of the present study further show that TLM treatment does not seem to be effective in every patient, because a reduction of frequency of sexual thoughts was reported in only 60.0% after CPA treatment and 75.4% after GnRH agonist treatment. A reduction of intensity of sexual thoughts was reported in only 52.0% after CPA treatment and 66.7% after GnRH agonist treatment. The high number of patients in which TLM treatment seems to be ineffective could represent offenders who received the TLM for only a short period of time. Further research should address the question as to whether these offenders have specific features that interfere with TLM treatment.

Furthermore, a considerable number of sex offenders are being treated with SSRI (11.5%) and antipsychotic medications (9.8%), agents that were not considered in the study conducted by Czerny et al. [13]. SSRI as well as antipsychotic drugs are not officially approved by the German Federal Institute for Drugs and Medical Devices for the treatment of paraphilic patients. Nevertheless, current guidelines suggest using SSRI in addition to psychotherapy in order to treat mild forms of paraphilia and to start TLM treatment if there is a risk of sexual recidivism and SSRI do not show the desired effects. Different studies have also shown that SSRI are able to reduce sexual drive and functioning and are especially effective in patients with obsessive-compulsive sexual deviances [19,24,49–51]. Furthermore, SSRI are also commonly used in the United States and Canada to treat sex offenders. While in Germany, SSRI are prescribed in 62.5% of all institutions, they are used in 52.8% of all community and residential programs in the United States, and in 61.2% of all programs in Canada, showing that the prescription frequency in these countries is comparable [37].

Uncontrolled studies have reported about sex offenders with personality disorders and impulsive disorders who are being treated with antipsychotics [52]. The results of the current study show for the first time that antipsychotics are being used frequently in Germany to treat sex offenders. Because current guidelines do not recommend using these medications to treat paraphilic patients and controlled clinical trials are missing, their prescription should be performed very carefully, especially for individuals with comorbid disorders [24].

As shown in the present study, one has to keep in mind that CPA as well as GnRH agonist application is usually accompanied by a large number of side effects. Most side effects reported (e.g., gynecomastia, hypogonadism, or decreased body hair) are associated with low testosterone levels and are reversible when therapy is ended. Low testosterone levels are also followed by a decrease in estrogen serum concentrations, causing a loss of bone mineral density and an increased risk of osteoporosis and bone fractures [30]. Thus, the patient's bone mineral density has to be closely monitored, and if necessary, treated prophylactically. When TLM therapy is ended, bone mineral density usually recovers within 9–12 months, but in older individuals in particular, it does not regain the pretreatment level [30,32]. In the present study, a loss of bone mineral density was only reported for men treated with GnRH agonists: a finding that poses the question as to whether an examination of bone mineral density under CPA treatment is not conducted on a regular basis in German forensic-psychiatric institutions. Furthermore, the duration of therapy and diseases that are already in existence play an important role concerning the occurrence and severity of possible side effects, factors that were not considered and that significantly limit the interpretability of the data. Nevertheless, the reversibility of the side effects when ending TLM treatment constitutes a great advantage compared with orchiectomy. Between 1998 and 2007, the German Medical Board agreed to 1.4 requests by convicted sex offenders for voluntary orchiectomy per year, showing that it is still performed in Germany [53]. The number of patients undergoing orchiectomy was not evaluated in the present study.

The current study provides an insight into the frequency of prescription of TLM in sex offenders in Germany. Due to a high participation rate within the institutions contacted, the findings can be viewed as representative for German forensic-psychiatric institutions. Nevertheless, it has to be remarked that the four institutions that did not participate because of data protection regulations were all localized in one state (North Rhine Westphalia), thus restricting interpretability of the data for this region. Further, the results are limited by the fact that the participating institutions were not evaluated on one single day, thus making the data vulnerable to effects caused by the different assessment dates. In light of the idea of recruiting a sample as representative as possible but at the same time bearing possible time effects in mind, four

fixed assessment dates were decided upon as constituting the best solution to this problem.

One also has to take into consideration that all data reported on treatment effectiveness and side effects of TLM are based solely on the reports of the clinicians and have not been evaluated systematically by means of controlled clinical trials. Further, all findings are based on mere quantitative information, and information about treatment effects and side effects were only reported for about 80–88% of all sex offenders in the institutions participating. Furthermore, interpretability of treatment effectiveness is limited because the serum testosterone concentrations of the sex offenders after TLM treatment were not evaluated. The serum testosterone concentrations could possibly explain the differences in the effectiveness of CPA compared with GnRH agonists, because different studies have already shown that GnRH agonists seem to be more potent in lowering serum testosterone levels [9,20,21,23,24,47,48]. Interpretability of treatment effectiveness is further limited because the dosage of TLM agents was not assessed specifically. It is therefore not clear whether the observed differences in treatment effectiveness were influenced by the use of different dosages in the treatment of the individual offenders. Sex offenders in Germany have the right to refuse treatment with TLM. Another important limitation of the study is that no information about the number of sex offenders for whom TLM therapy was recommended but who declined to be treated with TLM was available. This is an important fact that should be considered in future studies.

Conclusion

Almost 16% of all sex offenders in German forensic-psychiatric institutions are being treated with TLM. In many cases, clinicians report a considerable decrease in deviant sexual interests and fantasies. However, one always has to bear in mind that placebo-controlled, double-blind clinical studies on treatment effectiveness are still not available. Besides, TLM treatment is usually accompanied by various mild as well as severe side effects. The benefits and risks thus have to be assessed thoroughly before starting TLM treatment. In order to identify possible complications beforehand and thus be able to keep them under control, TLM treatment should always be planned by a multidisciplinary team consisting of a specialist in sexual medicine, a psychotherapist, and an

endocrinologist [32]. Bearing these suggestions in mind, the application of TLM can constitute an addition to psychotherapeutic treatment methods and as such are already regularly used in German forensic-psychiatric institutions.

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